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ABSTRACT

The United States Training and Employment Service General Aptitude Test Battery (GATB), first published in 1947, has been included in a continuing program of research to validate the tests against success in many different occupations. The GATB consists of 12 tests which measure nine aptitudes: General Learning Ability; Verbal Aptitude; Numerical Aptitude; Spatial Aptitude; Form Perception; Clerical Perception; Motor Coordination; Finger Dexterity; and Manual Dexterity. The aptitude scores are standard scores with 100 as the average for the general working population, and a standard deviation of 20. Occupational norms are established in terms of minimum qualifying scores for each of the significant aptitude measures which, when combined, predict job performance. Cutting scores are set only for those aptitudes which aid in predicting the performance of the job duties of the experimental sample. The GATB norms described are appropriate only for jobs with content similar to that shown in the job description presented in this report. A description of the validation sample is included. (AG)

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June 1970

U.S. Training and Employment Service
Technical Report
S-85R

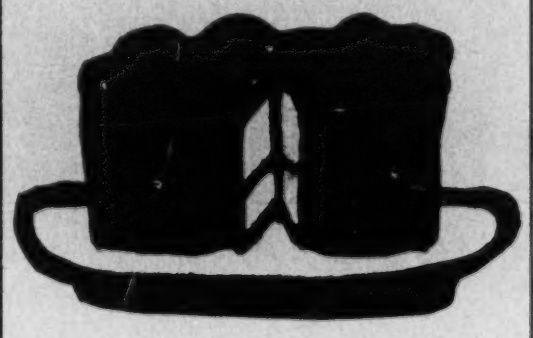
Development of USTES

APTITUDE TEST BATTERY FOR

BAKER

(bake. prod.)
526.781

U.S DEPARTMENT OF LABOR
Manpower Administration



TM 001 282

Technical Report on Development of USTES Aptitude Test Battery

For . . . . .

BAKER (bake. prod.) 526.781

S-85R

(Developed in Cooperation with the
New York State Employment Service)

U.S. Department of Labor
Manpower Administration

June 1970

FOREWORD

The United States Training and Employment Service General Aptitude Test Battery (GATB) was first published in 1947. Since that time the GATB has been included in a continuing program of research to validate the tests against success in many different occupations. Because of its extensive research base the GATB has come to be recognized as the best validated multiple aptitude test battery in existence for use in vocational guidance.

The GATB consists of 12 tests which measure 9 aptitudes: General Learning Ability, Verbal Aptitude, Numerical Aptitude, Spatial Aptitude, Form Perception, Clerical Perception, Motor Coordination, Finger Dexterity, and Manual Dexterity. The aptitude scores are standard scores with 100 as the average for the general working population, with a standard deviation of 20.

Occupational norms are established in terms of minimum qualifying scores for each of the significant aptitude measures which, in combination, predict job performance. For any given occupation, cutting scores are set only for those aptitudes which contribute to the prediction of performance of the job duties of the experimental sample. It is important to recognize that another job might have the same job title but the job content might not be similar. The GATB norms described in this report are appropriate for use only for jobs with content similar to that shown in the job description included in this report.

GATB Study #2080

Development of USTES Aptitude Test Battery

For

BAKER (bake. prod.) 526.781-010

S-85R

This report describes research undertaken for the purpose of developing General Aptitude Test Battery (GATB) norms for the occupation of Baker (bake. prod.) 526.781-010. The following norms were established:

GATB Aptitudes	Minimum Acceptable GATB Scores
S- Spatial Aptitude	70
Q- Clerical Perception	80
F- Finger Dexterity	75

Research Summary

Sample:

65 male students enrolled in two senior classes in the Baking course at Food Trades Vocational High School in New York City. This study was conducted prior to the requirement of providing minority group information. Therefore, minority group status is unknown.

Criterion:

School grades.

Design:

Concurrent (test and criterion data were collected at approximately the same time.

Minimum aptitude requirements were determined on the basis of a job analysis and statistical analyses of aptitude mean scores, aptitude-criterion correlations and selective efficiencies.

Concurrent Validity:

Phi coefficient = .52 ($P/2 < .0005$)

Effectiveness of Norms:

Only 65% of the nontest-selected students for this study were good students; if the students had been test-selected with the above norms, 82% would have been good students. Thirty-five percent of the nontest-

selected students used for this study were poor students; if the students had been test-selected with the above norms, only 18% would have been poor students. The effectiveness of the norms is shown graphically in Table 1.

TABLE 1

Effectiveness of Norms

	Without Tests	With Tests
Good Students	65%	82%
Poor Students	35%	18%

Sample Description

Size:

N = 65

Occupational Status:

Students

Educational Setting:

Students enrolled in senior classes in a Baking course at Food Trades Vocational High School in New York, New York.

Employer Selection Requirements:

Education: Completion of junior high school

Previous Experience: None

Tests: NYC Board of Education achievement tests

Other: Student's interest and desire to take Baking course

Principal Activities:

The job duties for each worker are comparable to those shown in the job description in the Appendix.

Minimum Experience:

None

TABLE 2
Mean, Standard Deviation (SD), Range and Pearson-Product Moment Correlation with the Criterion for Age

	Mean	SD	Range	r
Age (years)	17.4	.6	16-20	-.123

All students were in their senior year of vocational school.

Experimental Test Battery

All 12 tests of the GATB, B-1002A, were administered in February 1954 and May 1955.

Criterion

Although the sample was composed of two classes a year apart, all of the students were taking the same course and comparable criterion data were obtained. The criterion data for the sample were collected at the end of the senior year of each of the classes and consisted of average grades in shop courses for the four terms of the junior and senior years.

Criterion Score Distribution:

Actual Range: 70 - 91
Mean: 82.2
Standard Deviation: 5.5

Criterion Dichotomy:

The criterion distribution was dichotomized into low and high groups by placing 35% of the sample in the low group to correspond with the percentage of workers considered unsatisfactory or marginal. Workers in the high criterion group were designated as "good workers" and those in the low group as "poor workers." The criterion critical score is 81.

Aptitudes Considered for Inclusion in the Norms

Aptitudes were selected for tryout in the norms on the basis of a qualitative analysis of job duties involved and a statistical analysis of test and criterion data. Aptitude M which does not have a significant correlation with the criterion was considered for inclusion in the norms because qualitative analyses indicated they were important for the job duties and the sample had a relatively high means on this aptitude. Tables 3, 4, and 5, show the results of the qualitative and quantitative analysis.

TABLE 3

Qualitative Analysis
(Based on the job analysis, the aptitudes indicated appear to be important to the work performance)

Aptitudes	Rationale
G - General Learning Ability	Required to determine whether standard recipes need be increased or decreased to make required amount of bakery products on bake-order sheet.
N - Numerical Aptitude	Required in calculation of quantities and proportions of ingredients based on master recipes and also in a variety of tasks involving measurement of temperature, time and weights.
P - Form Perception	Required in shaping dough, placing materials in containers or pans that conform to the shapes of products being baked and in making decorative shapes.
Q - Clerical Perception	Required to order supplies, prepare reports and to read recipes accurately.
F - Finger Dexterity	Required in handling ingredients and utensils.
M - Manual Dexterity	Required in handling utensils, apparatus and finished products.

TABLE 4

Means, Standard Deviations (SD), Ranges and Pearson Product-Moment Correlations with the Criterion (r) for the Aptitudes of the GATB.

	Mean	SD	Range	r
G - General Learning Ability	88.8	11.9	66-127	.351**
V - Verbal Aptitude	89.4	11.0	70-117	.155
N - Numerical Aptitude	87.4	14.2	55-124	.221
S - Spatial Aptitude	95.2	16.0	58-143	.430**
P - Form Perception	93.1	14.1	47-123	.377**
Q - Clerical Perception	92.2	10.0	70-120	.356**
K - Motor Coordination	93.1	15.0	56-120	.165
F - Finger Dexterity	90.3	19.2	48-137	.282*
M - Manual Dexterity	99.0	19.8	63-147	.134

* Significant at .05 level
** Significant at .01 level

TABLE 5

Summary of Qualitative and Quantitative Data

Type of Evidence	Aptitudes								
	G	V	N	S	P	Q	K	F	M
Job Analysis Data									
Important	X		X		X	X		X	X
Irrelevant									
Relatively High Mean				X	X		X		X
Relatively Low Standard Dev.	X	X			X	X			
Significant Correlation With Criterion	X			X	X	X		X	
Aptitudes to be Considered for Trial Norms	G			S	P	Q		F	M

Derivation and Validity of Norms

Final norms were derived on the basis of the degree to which trial norms consisting of various combinations of aptitudes G, S, P, Q, F, and M at trial cutting scores were able to differentiate between the 65% of the sample considered to be good workers and the 35% of the sample considered to be poor workers. Trial cutting scores at five-point intervals approximately one standard deviation below the mean are tried because this will eliminate about one-third of the sample with three-aptitude norms. For four-aptitude trial norms, cutting scores of slightly less than one standard deviation below the mean will eliminate about one-third of the sample; for two-aptitude trial norms, minimum cutting scores of slightly more than one standard deviation below the mean will eliminate about one-third of the sample. The phi coefficient was used as a basis for comparing trial norms. Norms of S-70, Q-80, and F-75 provided optimum differentiation for the occupation of Baker (Bake. prod.) 526.781-010. The validity of these norms is shown in Table 6 and is indicated by a phi coefficient of .52 (statistically significant at the .0005 level).

TABLE 6

Validity of Test Norms
S-70, Q-80 and F-75

	Nonqualifying Test Scores	Qualifying Test Scores	Total
Good Students	5	37	42
Poor Students	15	8	23
Total	20	45	65

Phi coefficient = .52

Chi square (X^2_y) = 17.4

Significance level = P/2 < .0005

Determination of Occupational Aptitude Pattern

The data for this study met the requirements for incorporating the occupation studied into OAP-45 which is shown in the 1970 edition of Section II of the Manual for the General Aptitude Test Battery. A phi coefficient of .42 is obtained with the OAP-45 norms of S-80, Q-90, and F-80.

FACT SHEET

Job Title

Baker (bake prod.) 526.781-010

Job Summary

Bakes bread, rolls, cakes, pies, and similar products in a commerical bakery or eating establishment.

Work Performed

Mixes dough or batter and forms products: Obtains recipes and bake-order sheet to determine number and kind of bakery products to be made; calculates quantities of ingredients, increasing or decreasing standard recipe to make required amount of bread rolls, cakes, pies or other bakery products; weighs out, or receives correct amounts of ingredients such as flour, sugar, eggs, milk, water, shortening, baking soda and powder, salt, and flavorings; places correct proportions of ingredients in mixing machine in proper order and mixes ingredients for a prescribed period; removes dough or batter from mixing machine by increasing speed of paddles to force mixture out and into dough trays or other containers; may estimate costs and order supplies.

1. Breads and rolls: Tests consistency of dough by observing and feeling it; checks temperature with hand thermometer; divides dough into sections of desired size by cutting off lumps with a knife or by admitting dough from trough through a chute into dividing machine; allows dough to rise and kneaks it by hand prior to and after dividing to remove excess gases caused by fermentation of yeast; forms dough into shape desired by rolling it with palms of hands, or by feeding dough pieces into molding machine or rounder; places formed or cut dough in pans or on baking boards and allows it to rise to proper height.

2. Cakes: Lines cake pans with paper or greases them and sprinkles flour lightly over surface to prevent baked product from adhering to pan; fills pan with batter by placing it on scale and scooping batter into pan until specified weight is obtained, or by using depositor machine; fills pastry bag with batter and squeezes a quantity of batter out onto greased pans in shape and size desired, if making small, individual cakes, cream puff, or eclairs.

3. Cookies, crackers, or biscuits: Cuts large lump of dough from dough trough, rolls it with rolling pin to obtain proper thickness; forms cookies, crackers, or biscuits by pressing a cutter through dough or by using a cooky machine, and arranges cut pieces on greased pans or trays; drops spoonfuls of batter or squeezes batter out of pastry bag onto greased sheet pans, if making cookies from batter.

4. Doughnuts or crullers: Rolls dough to thickness desired and forms them with doughnut machine, cutter, or squeezes batter out of pastry bag.

5. Pies - Sprinkles flour on table top, places dough on table flattens it with hands and rolling pin, and cuts dough with a circular metal cutter (each cut is sufficient for one pie top or one pie bottom); places cut dough over bottom of pie plate, pressing it into place with fingers; fills dough-lined pie plates with fruit filling, spreading it evenly with spoon; places disk of dough over filling and punctures top crust with knife or sharp stick to provide air holes which permit escape of steam during baking; may arrange narrow strips of dough in the form of lattice-work across top of open pies; crimps edges of pie crust to prevent over-flow of material during baking; puts pie plate with only bottom disk of dough in place on rack to be taken to oven if pies are to be filled with cream or custard.

Cooks products - Controls temperature of oven either by regulating thermostats or by adjusting drafts and dampers; places dough-and batter-filled pans in oven with peel, and, if baking hard-crust breads, sticks, or rolls, places dough directly on hearth of oven; checks progress of baking by observing appearance of goods, and noting length of time in oven; may fill baked pie shells while in oven with cream or custard, using a long-handled dipper; removes baked products from oven with peel and places them on cooling rack; if cooking doughnuts without using doughnut machine, drops them in kettle containing heated grease and allows them to cook for required length of time.

Finishes baked products - Mixes ingredients such as sugar, milk, eggs and butter for icings, fillings, and meringues, cooking them if necessary; applies to such products as cakes, cookies, doughnuts, and pies, by spreading with a spatula or knife or by using a depositor machine; may decorate cakes or pastries by applying icing in decorative patterns with a pastry bag; may prepare reports of products baked.

Effectiveness of Norms

Only 65% of the non-test-selected students used for this study were good students; if the students had been test-selected with the S-85R norms, 82% would have been good students. Thirty-five percent of the non-test-selected students used for this study were poor students; if the students had been test-selected with the S-85R norms, only 18% would have been poor students.

Applicability of S-85R Norms

The aptitude test battery is applicable to jobs which include a majority of duties described above.

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